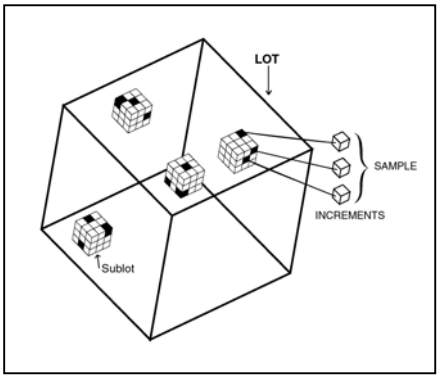
SAMPLING OF BITUMINOUS PAVING MIXTURES

FOP FOR AASHTO T 168



Sampling from a lot

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Significance

Testing bituminous paving mixtures in the field begins with obtaining and preparing the sample to be tested. Standardized procedures for obtaining a representative sample have been established. Producing strong, durable, reliable pavement in roadways requires careful sampling and accurate testing.

Technicians must be patient and follow these procedures. If one considers that the specifications require quality tests to be made on only a small portion of the total material placed, the need for a truly representative sample is apparent. For this reason, every precaution must be taken to obtain a sample that is truly representative of the entire batch and then to protect that sample from contamination and physical damage.

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HMA sample

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Scope

This procedure covers the sampling of bituminous paving mixtures from HMA plants; haul units, and roadways, in accordance with AASHTO T 168.

Sampling is as important as testing, and every precaution must be taken to obtain a truly representative sample.

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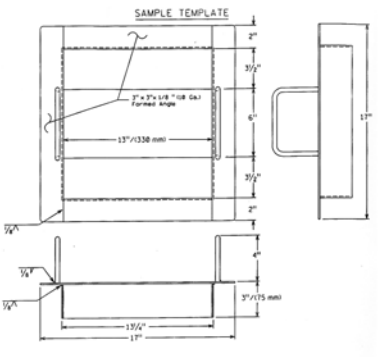
The sampling of aggregate used in bituminous paving mixtures shall be in accordance with the FOP for AASHTO T 2.

Apparatus

- Flat-bottomed scoop 150 x 400 x 100 mm (6 x 16 x 4 in.) if sampling from a roadway
- Shovel
- Sample containers: such as cardboard boxes, metal cans, stainless steel bowls, or other agency-approved containers
- Template to match conveyor belt shape



Cookie Cutter Sampling Device

- Scoops, trowels, or other equipment to obtain mix
- Sampling plate: heavy gauge metal plate 380 mm x 380 mm (15 in x 15 in) minimum 8 gauge thick with a wire attached to one corner long enough to reach from the center of the paver to the outside of the farthest auger extension. Holes ¼" in diameter should be provided in each corner.
- Cookie cutter sampling device: A 330 mm (13 in.) square sampling template, constructed from 75 mm x 50 mm x 3 mm (3 in. x 2 in. x 1/8 in.) formed steel angle with two 100 mm x 150 mm x 9 mm (4 in. x 6 in. x 3/8 in.) handles. See diagram

Note 1: Sampling Plate and Cookie cutter may be sized appropriately to accommodate sample size requirements.

General Comments

05 1. Samples of mix upon which acceptance or rejection is based shall be selected at random, and may be obtained by, or under the observation of, the purchaser or authorized representative.

Note 2: Care shall be taken to prevent contamination of bituminous mixes by dust or other foreign matter, and to avoid segregation of aggregate and bituminous materials.

2. Some agencies require mechanical sampling devices for hot mix asphalt (HMA) and cold feed aggregate on some projects. These are normally permanently attached devices that allow a sample container to pass perpendicularly through the entire stream of material or divert the entire stream of material into the container. Operation may be hydraulic, pneumatic, or manual and allows the sample

06 container to pass through the stream twice, once in each direction, without overfilling. Special caution is necessary with manually operated systems since a consistent speed is difficult to maintain and non-representative samples may result. Check agency requirements for the specifics of required sampling systems.

Sample Size

Sample size depends on the test methods specified by the agency for acceptance. Check agency requirement for the size required.

Sampling

General

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1. The material shall be inspected to determine variations. The seller shall provide equipment for safe and appropriate sampling including sampling devices on plants, when required.

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2. Place dense graded mixture samples in cardboard boxes, stainless steel bowls or other agency approved containers. Place open graded mixture samples in stainless steel bowls. Do not put open graded mixture samples in boxes until they have cooled to the point that bituminous material will not migrate from the aggregate.

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3. Sampling from the Roadway will require the contractor to repair the sampled location.

Sampling from a Conveyor Belt

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1. Stop the conveyor belt.
2. Select at least three areas of approximately equal size on the belt for sampling.
3. Insert template, the shape of which conforms to the shape of the belt, in each of the locations to be sampled.

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4. Obtain three approximately equal increments of material that will form a sample of the required size when combined.
5. Scoop all material between template into a suitable container.

12

Attached Sampling device

Attached Sampling Devices

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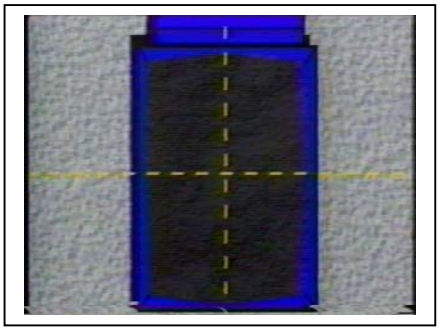
1. When using an attached sampling device, pass the container twice through the material perpendicularly without overfilling the container.

2. Repeat until proper sample size has been obtained.



14

Quadrants in a load

Sampling from Haul Units

1. Obtain samples in four approximately equal increments from haul units.

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2. Obtain each increment from approximately 300 mm (12 in.) below the surface, in each of the four quadrants of the load.
3. Combine the increments to form a sample of the required size.

Sampling from a Roadway Prior to Compaction (Scoop Method)

16

Sampling from transport

1. Obtain samples in approximately equal increments, after placement and prior to rolling, using the scoop.
2. Make a vertical face with the shovel about 750 mm (30 in.) parallel with centerline.
3. Pull the material back approximately 450 mm (18 in.).
4. Place the scoop on the pavement or base as flat as possible at one side of the vertical face and fill the scoop. Make sure that sufficient pressure is exerted on the scoop to remove all of the material to its full depth.
5. Close the lid and remove the scoop when it is full.
6. Repeat Steps 2 through 5 to obtain the required sample size.

17

Scoop

18

Sampling from Roadway Prior to Compaction (Plate Method)

Plate Method using the “cookie cutter” sampling device.

19

There are two conditions that will be encountered when sampling Hot Mix Asphalt (HMA) from the roadway prior to compaction. The two conditions are:

1. Laying HMA on grade, or untreated base material requires Method 1.
2. Laying HMA on existing asphalt or laying a second lift of HMA requires Method 2.

SAFETY:

Sampling is performed behind the paving machine and in front of the breakdown roller. For safety, the roller must remain at least 3 m (10 ft) behind the sampling operation until the sample has been taken and the hole filled with loose HMA.

Method 1 requires a plate to be placed in the roadway in front of the paving operation. There is always concern when working in the path of moving equipment. It is safest to stop the paving train while a plate is installed in front of the paver. When this is not possible the following safety rules must be followed.

1. The plate placing operation must be at least 3 m (10 ft) in front of the paver or pickup device. The technician placing the plate must have eye contact and communication with the paving machine operator. If eye contact cannot be maintained at all time, a third person must be present to provide communication between the operator and the technician.
2. No technician is to be between the asphalt supply trucks and the paving machine. The exception to this rule is if the supply truck is moving forward creating a windrow, in which case the technician must be at least 3 m (10 ft) behind the truck.
3. At any time the Engineer feels that the sampling technique is creating an unsafe condition, the operation is to be halted until it is made safe or the paving operation will be stopped while the plate is being placed.

Method 1 - Obtaining a Sample on Untreated Base:

1. Following the safety rules detailed above, the technician is to:

a. Smooth out a location in front of the paver at least 0.5 m (2 ft) inside the edge of the mat.

b. Lay the plate down diagonally with the direction of travel, keeping it flat and tight to the base with the lead corner facing the paving machine.

2. Secure the plate in place with a nail through the hole in the lead corner of the plate.

24

3. Pull the wire, attached to the outside corner of the plate, taut past the edge of the HMA mat and secure with a nail.

4. Let the paving operation proceed over the plate and wire. Immediately proceed with the sampling.

5. Using the exposed end of the wire, pull the wire up through the fresh HMA to locate the corner of the plate. Place the "cookie cutter" sampling device, just inside the end of the wire; align the cutter over the plate. Press "cookie cutter" device down through the HMA to the plate.

6. Using a small square tipped shovel and/or scoop, carefully remove all the HMA from inside of the cutter and place in a sample container.

23

7. Remove the sample cutter and the plate from the roadway. The hole made from the sampling must be filled with loose HMA.

25

Method 2 Obtaining a Sample on Asphalt Surface:

1. After the paving machine has passed the sampling point, immediately place the "cookie cutter" sampling device on the location to be sampled. Push the cutter down through the HMA until it is flat against the underlying asphalt mat.

2. Using a small square tipped shovel and/or scoop, carefully remove all the HMA from inside of the cutter and place in a sample container. The hole made from sampling must filled with loose HMA.

Identification and Shipping

1. Identify sample containers as required by the agency.
2. Ship samples in containers that will prevent loss, contamination, or damage.

26

27

Tips!

Check agency requirements for:

- Sample size needed
- Sampling device requirements
- Allowable sampling techniques

REVIEW QUESTIONS

1. Bituminous paving mixture sample sizes are based on what?

2. What types of containers are used for asphalt samples?

3. Describe how samples are obtained from:

   - Conveyor belts
   - Plants with attached sampling devices
   - Truck transports
   - Roadway

PERFORMANCE EXAM CHECKLIST

SAMPLING BITUMINOUS PAVING MIXTURES FOP FOR AASHTO T 168

Participant Name _____ Exam Date _____

Record the symbols "P" for passing or "F" for failing on each step of the checklist.

Procedure Element	Trial 1	Trial 2
1. Samples from conveyors taken correctly.		
a. Belt stopped and template inserted?	_____	_____
b. All material removed?	_____	_____
c. Three increments taken?	_____	_____
2. Sample taken with sampling device correctly?	_____	_____
a. Sampling device passed through stream twice perpendicular to material?	_____	_____
b. Sampling device not over filled?	_____	_____
3. Samples from truck transports taken from four quadrants at required depth of 300 mm (12in)?	_____	_____
4. Samples from roadway taken correctly with scoop.		
a. Vertical face in pavement with shovel parallel to centerline?	_____	_____
b. Material pulled back approximately 450 mm (18 in.)?	_____	_____
c. Scoop flat on paving surface?	_____	_____
d. Scoop pushed into vertical face until full?	_____	_____
5. Samples from roadway taken correctly with plate(s).		
a. When on untreated base plate placed well in front of paver?	_____	_____
b. Wire pulled to locate plate corner?	_____	_____
c. Cookie cutter placed on asphalt and pushed through to plate?	_____	_____
d. All material removed from inside the cutter?	_____	_____
6. Sample placed in appropriate container.	_____	_____
7. Sample size meets agency requirements?	_____	_____
8. Sample identified as required?	_____	_____

Comments: First attempt: Pass ☐ Fail ☐ Second attempt: Pass ☐ Fail ☐

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Examiner Signature _____ WAQTC #:_____

ORAL PERFORMANCE EXAM CHECKLIST

SAMPLING BITUMINOUS PAVING MIXTURES FOP FOR AASHTO T 168

Participant Name _____ Exam Date _____

Record the symbols "P" for passing or "F" for failing on each step of the checklist.

Procedure Element	Trial 1	Trial 2
1. How must a sample be obtained from a conveyor belt?		
a. Stop the belt and insert the template.	_____	_____
b. Remove all material from inside the template.	_____	_____
c. Take three increments.	_____	_____
2. At the hot plant how must a sample be obtained using a sampling device?		
a. Pass the sampling device through stream twice perpendicular to material.	_____	_____
b. The sampling device can not be over filled.	_____	_____
3. What must be done to sample from transport units?		
a. Divide the unit into four quadrants.	_____	_____
b. Obtain increments from each quadrant, 300 mm (12 in) below surface.	_____	_____
4. Describe how to take samples from the roadway with a scoop.		
a. Make a vertical face in pavement with shovel parallel to centerline.	_____	_____
b. Pull the material back approximately 450 mm (18 in.).	_____	_____
c. Place the scoop flat on the paving surface.	_____	_____
d. Push the scoop into the vertical face until full.	_____	_____
5. Describe how to take samples from the roadway using a plate.		
a. Place the plate well in front of the paver.	_____	_____
b. Pull the wire to locate the corner of the plate.	_____	_____
c. Place the cutter on the HMA above the plate and push it down to the plate.	_____	_____
d. Collect all the material inside the cutter.	_____	_____
6. What types of containers can be used?		
a. Card board boxes, stainless steel bowls, or other agency approved containers.	_____	_____
7. What dictates size of sample?		
a. Agency requirements.	_____	_____

Comments: First attempt: Pass ☐ Fail ☐ Second attempt: Pass ☐ Fail ☐

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Examiner Signature _____ WAQTC #:_____